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# NASA Procedural Requirements

**COMPLIANCE IS MANDATORY****NPR 7123.1B**

Effective Date: April 18, 2013

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2018[Printable Format \(PDF\)](#)

Request Notification of Change (NASA Only)

## Subject: NASA Systems Engineering Processes and Requirements

**Responsible Office: Office of the Chief Engineer**

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## Preface

### P.1 Purpose

The purpose of this document is to clearly articulate and establish the requirements on the implementing organization for performing systems engineering. Systems Engineering (SE) is a logical systems approach performed by multidisciplinary teams to engineer and integrate NASA's systems to ensure NASA products meet customers' needs. Implementation of this systems approach will enhance NASA's core engineering capabilities while improving safety, mission success, and affordability. This systems approach is applied to all elements of a system (i.e., hardware, software, human system integration) and all hierarchical levels of a system over the complete project life cycle.

### P.2 Applicability

- a. This NASA Procedural Requirement (NPR) applies to NASA Headquarters and NASA Centers, including component facilities and technical and service support centers. This NPR applies to NASA employees and NASA support contractors that use NASA processes to augment and support NASA technical work. This NPR applies to Jet Propulsion Laboratory, a Federally Funded Research and Development Center, other contractors, grant recipients, or parties to agreements only to the extent specified or referenced in the appropriate contracts, grants, or agreements. (See Chapter 4.)
- b. This NPR applies to space flight, research and technology, and institutional programs and projects (including Information Technology (IT)), as appropriately tailored and customized for size and complexity. See Paragraph 2.2 for tailoring and customization descriptions.
- c. In this document, a project is a specific investment having defined goals, objectives, requirements, life-cycle cost, a beginning, and an end. A project yields new or revised products or services that directly address NASA's strategic needs. Projects may be performed wholly in-house; by Government, industry, or academia partnerships; or through contracts with private industry.
- d. The requirements enumerated in this document are applicable to all new programs and projects, as well as to all programs and projects currently in Formulation Phase as of the effective date of this document. (See NPR 7120.5, NPR 7120.7, and NPR 7120.8, as appropriate, for definitions of program phases.) This NPR also applies to programs and projects in their Implementation Phase as of the effective date of this document. For existing programs/projects regardless of their current phase, the Designated Governing Authority (DGA) may grant waivers/deviations allowing continuation of current practices that do not comply with all or sections of this NPR.
- e. Many other discipline areas such as health and safety, medical, reliability, maintainability, quality assurance, IT, security, logistics, and environmental perform functions during project life-cycle phases that influence or are influenced by the engineering functions performed and need to be fully integrated with the engineering functions. The description of these disciplines and their relationship to the overall management life cycle are defined in other

NASA directives; for example, the safety, reliability, maintainability, and quality assurance requirements are defined in the 8700 series of directives, and health and medical requirements are defined in the 8900 series. To that end, this document contains human systems integration language and requirements. (See NASA Standard 3001, NASA Space Flight Human System Standard, and NPR 8705.2, Human-Rating Requirements for Space Systems.)

f. In this NPR, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The requirements are explicitly shown as [SE-XX] for clarity and tracking purposes. The terms "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice and is recommended but not required, "will" denotes expected outcome, and "are/is" denotes descriptive material.

g. In this NPR, all document citations are assumed to be the latest version, unless otherwise noted.

### **P.3 Authority**

- a. National Aeronautics and Space Act, as amended, 51 U.S.C. § 20113(a).
- b. NPD 1000.0, NASA Governance and Strategic Management Handbook.
- c. NPD 1000.3, The NASA Organization.
- d. NPD 1001.0, NASA Strategic Plan.
- e. NPD 7120.4, NASA Engineering and Program/Project Management Policy.

### **P.4 Applicable Documents and Forms**

- a. NPR 7120.5, NASA Space Flight Program and Project Management Requirements.
- b. NPR 7120.7, NASA Information Technology and Institutional Infrastructure Program and Project Management Requirements.
- c. NPR 7120.8, NASA Research and Technology Program and Project Management Requirements.
- d. NPR 7150.2, NASA Software Engineering Requirements.
- e. NPR 8705.2, Human-Rating Requirements for Space Systems.
- f. NASA-STD-3001, NASA Space Flight Human System Standard.

### **P.5 Measurement/Verification**

a. Compliance with this NPR will be documented by Center Directors in the SE NPR Compliance Matrix for Centers (Appendix H.1). Center self-assessment of compliance should be conducted approximately every two years or at the request of the Office of Chief Engineer (OCE). A copy of the Compliance Matrix is forwarded to the Office of the Chief Engineer. In addition, the OCE conducts periodic assessments at the Centers to obtain feedback on the effectiveness of NPR 7123.1 to facilitate updating the NPR.

b. Compliance for programs and projects is documented by appending a completed Compliance Matrix for this NPR (see Appendix H.2) to the Systems Engineering Management Plan (SEMP).

### **P.6 Cancellation**

NID 7123-69, NASA Interim Directive (NID) NASA Systems Engineering Processes and Requirements, dated March 13, 2012.

NPR 7123.1A, NASA Systems Engineering Processes and Requirements, w/Change 1 (11/04/09), dated March 26, 2007.

/S/

Michael Ryschkewitsch  
Chief Engineer

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